

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47-091-01267 County Taylor District Fetterman  
Quad Gladesville 7.5' Pad Name OES Field/Pool Name Unknown  
Farm name Orthodox Educational Society Well Number 4HM  
Operator (as registered with the OOG) PDC Mountaineer, LLC  
Address 120 Genesis Blvd. City Bridgeport State WV Zip 26330

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4365717.504809 Easting 588802.480616  
Landing Point of Curve Northing 4365479.576141 Easting 588883.354903  
Bottom Hole Northing 4363837.893347 Easting 589453.120747

Elevation (ft) 1945 GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other Frac Fluid  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine

Mud Type(s) and Additive(s)  
Surface: Air with soap & treated water as needed.  
Bottom Hole: Synthetic based mud averaging 12+ ppg & 47 Vis.

Date permit issued 06/18/2012 Date drilling commenced 08/06/2013 Date drilling ceased 08/29/2013  
Date completion activities began 10/08/2013 Date completion activities ceased 11/16/2013  
Verbal plugging (Y/N) N Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft Est: 245' Open mine(s) (Y/N) depths N  
Salt water depth(s) ft Est: 910' Void(s) encountered (Y/N) depths N  
Coal depth(s) ft Est: 273', 326', 414', & 468' Cavern(s) encountered depths N  
Is coal being mined in area (Y/N) N

RECEIVED  
Office of Oil & Gas  
Reviewed by: \_\_\_\_\_  
MAR 24 2014  
WV Department of Environmental Protection  
05/23/2014

API 47- 091 - 01267 Farm name Orthodox Educational Society Well number 4HM

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	30"	20"	105'	New	H-40/94#	None	N/A
Surface	17 1/2"	13 3/8"	545'	New	J-55 / 54.5#	182'	Y
Coal	N/A						
Intermediate 1	12 1/4"	9 5/8"	2511'	New	J-55 / 40#	353'	Y
Intermediate 2							
Intermediate 3							
Production	8 1/2"	5 1/2"	14,103'	New	P-110 / 20#	None	Y
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	N/A						
Surface	Class A	532	15.6	1.18	628	Surface	12
Coal							
Intermediate 1	Class A	875	15.6	1.18	1032	Surface	24
Intermediate 2							
Intermediate 3							
Production	L: Class A / T: Type 1	1684/1764	14.5/14.5	1.17/1.17	4068	Surface	N/A
Tubing							

Drillers TD (ft) 14,115'      Loggers TD (ft) 14,115'  
 Deepest formation penetrated Marcellus Shale      Plug back to (ft) N/A  
 Plug back procedure N/A

Kick off depth (ft) Monitor & nudge surface, KO point at 6800'

Check all wireline logs run       caliper     density     deviated/directional     induction  
     neutron     resistivity     gamma ray                             temperature     sonic

Well cored     Yes     No     Conventional     Sidewall                            Were cuttings collected     Yes     No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING \_\_\_\_\_

13 3/8" Surface String: Ran a total of 5 centralizers every other joint starting at Joint #1. Ran 1 basket at Joint #11 (182' from surface).  
 9 5/8" Intermediate String: Ran a total of 10 centralizers every 300 feet starting at Joint #2. Ran at basket at Joint 51 (depth from surface was 353').  
 5 1/2" Production String: Spiraglide centralizers on the first 155 joints. Bow Spring centralizers every 4 joints after that into surface casing, total of 25.

WAS WELL COMPLETED AS SHOT HOLE     Yes     No    DETAILS \_\_\_\_\_

WAS WELL COMPLETED OPEN HOLE?     Yes     No    DETAILS \_\_\_\_\_

WERE TRACERS USED     Yes     No    TYPE OF TRACER(S) USED \_\_\_\_\_

API 47- 091 - 01267 Farm name Orthodox Educational Society Well number 4HM

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
1	10/08/13	13872	13922	40	Marcellus
2	10/09/13	13672	13832	50	Marcellus
3	10/10/13	13469	13632	50	Marcellus
4	10/11/13	13272	13432	50	Marcellus
5	10/11/13	13072	13232	40	Marcellus
6	10/12/13	12872	13032	40	Marcellus
7	10/12/13	12672	12832	40	Marcellus
8	10/13/13	12472	12632	40	Marcellus
9	10/13/13	12272	12432	40	Marcellus
10	10/14/13	12074	12232	40	Marcellus
11	10/14/13	11872	12032	40	Marcellus
12	10/15/14	11672	11832	40	Marcellus
13	10/16/13	11472	11632	40	Marcellus
14	10/16/13	11272	11429	40	Marcellus
15	10/17/13	11072	11232	40	Marcellus
16	10/18/13	10870	11032	40	Marcellus

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
1	10/09/13	66	8243	9000	4789	289612	7091	NA
2	10/10/13	59	8388	9151	4786	292553	8403	NA
3	10/10/13	54	8446	9317	4737	270610	7319	NA
4	10/11/13	60	8407	8983	6637	247510	5740	NA
5	10/11/13	65	8203	8561	4919	288100	5301	NA
6	10/12/13	63	8314	9080	6190	283648	6874	NA
7	10/12/13	56	8661	9113	6595	197908	5381	NA
8	10/13/13	56	8480	9235	6769	290855	6581	NA
9	10/13/13	69	8358	9105	6975	289752	6320	NA
10	10/14/13	64	8463	9121	6265	290255	6575	NA
11	10/15/13	68	8056	8471	5869	289523	5234	NA
12	10/16/13	67	8222	9068	4973	288984	5346	NA
13	10/16/13	71	7924	8385	6229	291675	5305	NA
14	10/17/13	72	7883	8620	6375	286206	5205	NA
15	10/18/13	69	8427	8984	6039	292779	6423	NA
16	10/18/13	61	8233	9075	5357	236012	5494	NA

Please insert additional pages as applicable.

API 47- 091 - 01267 Farm name Orthodox Educational Society Well number 4HM

PERFORATION RECORD

Stage No.	Perforation date	Perforated from MD ft.	Perforated to MD ft.	Number of Perforations	Formation(s)
17	10/18/13	10672	10832	40	Marcellus
18	10/20/13	10472	10632	40	Marcellus
19	10/20/13	10272	10432	40	Marcellus
20	10/21/13	10072	10230	40	Marcellus
21	10/21/13	9872	10032	40	Marcellus
22	10/25/13	9678	9832	40	Marcellus
23	10/26/13	9472	9634	40	Marcellus
24	10/27/13	9272	9432	40	Marcellus
25	10/27/13	9072	9232	40	Marcellus
26	10/28/13	8873	9027	40	Marcellus
27	10/28/13	8672	8832	40	Marcellus
28	10/29/13	8472	8632	40	Marcellus

Please insert additional pages as applicable.

STIMULATION INFORMATION PER STAGE

Complete a separate record for each stimulation stage.

Stage No.	Stimulations Date	Ave Pump Rate (BPM)	Ave Treatment Pressure (PSI)	Max Breakdown Pressure (PSI)	ISIP (PSI)	Amount of Proppant (lbs)	Amount of Water (bbls)	Amount of Nitrogen/other (units)
17	10/19/13	69	7712	8471	6180	285268	5849	NA
18	10/20/13	66	7753	8488	5900	304443	5615	NA
19	10/21/13	70	7704	8388	5712	297568	5437	NA
20	10/21/13	71	7616	8338	5953	300281	5237	NA
21	10/25/13	68	7612	9116	6046	249142	5044	NA
22	10/26/13	76	7348	8192	6256	292356	5368	NA
23	10/26/13	72	7435	8228	6100	289765	5286	NA
24	10/27/13	71	7553	8547	5477	291928	5696	NA
25	10/27/13	72	7376	8294	5477	293494	5205	NA
26	10/28/13	71	7610	8352	6552	293454	5239	NA
27	10/28/13	78	7625	8989	6216	261625	4979	NA
28	10/29/13	77	7303	8063	6043	294768	5080	NA

Please insert additional pages as applicable

API 47- 091 - 01267 Farm name Orthodox Educational Society Well number 2HM

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>	
<u>Marcellus Shale</u>	<u>7776' - 8103'</u> TVD	<u>7975' - 14,115'</u> MD
_____	_____	_____
_____	_____	_____
_____	_____	_____

Please insert additional pages as applicable.

GAS TEST  Build up  Drawdown  Open Flow OIL TEST  Flow  Pump

SHUT-IN PRESSURE Surface N/T psi Bottom Hole N/T psi DURATION OF TEST N/T hrs

OPEN FLOW Gas 5,933 mcfpd Oil N/A bpd NGL N/A bpd Water 818 bpd GAS MEASURED BY  Estimated  Orifice  Pilot

LITHOLOGY/ FORMATION	TOP	BOTTOM	TOP	BOTTOM	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H <sub>2</sub> S, ETC)
	DEPTH IN FT NAME TVD	DEPTH IN FT TVD	DEPTH IN FT MD	DEPTH IN FT MD	
	0		0		
Little Lime	1050	1063	1050	1063	Due to air/fluid rotary drilling, fresh water, salt water, & coal are estimated from surrounding wells and reported on page 1.
Big Lime	1085	1308	1085	1308	
Pocono	1320	1412	1320	1412	
Berea	1440	1482	1440	1482	
Gantz	1608	1621	1608	1621	
50 Foot	1645	1690	1645	1690	
30 Foot	1695	1705	1695	1705	
4th Sand	2127	2172	2127	2172	
5th Sand	2265	2300	2265	2300	
Sycamore	6798	6803	6800	6805	
Tully	7485	7572	7512	7623	
Hamilton	7572	7776	7623	7975	
Marcellus	7776	8103	7975	14,115	Continuous shows of gas while drilling

Please insert additional pages as applicable.

Drilling Contractor Pioneer Energy Services  
Address 1083 N Eighty-Eight Rd City Rices Landing State PA Zip 15357

Logging Company Phoenix Technology Services USA Inc  
Address Foster Plaza 5, Ste. 300, 651 Holiday Drive City Pittsburgh State PA Zip 15220

Cementing Company Baker Hughes  
Address Rt. 2, Box 506, 837 Philippi Pike City Clarksburg State WV Zip 26301

Stimulating Company Baker Hughes  
Address Rt. 2, Box 506, 837 Philippi Pike City Clarksburg State WV Zip 26301

Please insert additional pages as applicable.

Completed by Bob Williamson Telephone 304-808-6296  
Signature [Signature] Title Sr Geologist Date 03/21/2014

Submission of Hydraulic Fracturing Chemical Disclosure Information Attach copy of FRACFOCUS Registry

# Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	10/9/2013
Job End Date:	10/29/2013
State:	West Virginia
County:	Taylor
API Number:	47-091-01267-00-00
Operator Name:	PDC Energy
Well Name and Number:	OES 4HM
Longitude:	-79.96811100
Latitude:	39.43634300
Datum:	NAD83
Federal/Tribal Well:	NO
True Vertical Depth:	8,000
Total Base Water Volume (gal):	7,065,492
Total Base Non Water Volume:	0



9101267

## Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	PDC	Base Fluid	Water	NA	100.00000	87.65377	None
			Sand (Proppant)	Baker Hughes	Proppant		
			Silica Substrate	NA	100.00000	11.72662	None
Hydrochloric Acid (15%)	Baker Hughes	Acidizing	Hydrochloric Acid	7647-01-0	15.00000	0.05986	None
			MaxPerm 20A	Baker Hughes	Friction Reducer		
			Aliphatic hydrocarbon	Proprietary	30.00000	0.04131	None
			Oxyalkylated alcohol	Proprietary	5.00000	0.00688	None
GW-3LDF	Baker Hughes	Water gellant	Guar gum	9000-30-0	60.00000	0.00711	None
			Paraffinic petroleum distillate	64742-55-8	30.00000	0.00355	None
			Petroleum distillates	64742-47-8	30.00000	0.00355	None
			1-Butoxy-2-propanol	5131-66-8	5.00000	0.00059	None
			Crystalline silica: Quartz (SiO2)	14808-60-7	5.00000	0.00059	None
			Isotridecanol, ethoxylated	9043-30-5	5.00000	0.00059	None
GasFlo G	Baker Hughes	Surfactant	Methanol	67-56-1	30.00000	0.01256	None
			SCW5279	Baker Hughes	Scale Inhibitor		

6/1

91-01267

1611

Sodium Hypochlorite 12%	Baker Hughes	Biocide	Ethylene glycol	107-21-1	60.00000	0.00861	None
			Sodium hypochlorite	7681-52-9	30.00000	0.00119	None
			Sodium chloride	7647-14-5	30.00000	0.00119	None
GBW 5	Baker Hughes	Frac gel breaker	Ammonium persulphate	7727-54-0	100.00000	0.00168	None
Ferratrol 300L	Baker Hughes	Iron Control	Citric Acid	77-92-9	60.00000	0.00155	None
Sodium Chlorite	Dupont	Biocide	Sodium chlorite	7758-19-2	31.00000	0.00117	None
CI-14	Baker Hughes	Corrosion Inhibitor	Methanol	67-56-1	100.00000	0.00060	None
			Polyoxyalkylenes	Proprietary	30.00000	0.00018	None
			Fatty acids	Proprietary	10.00000	0.00006	None
			Olefin	Proprietary	5.00000	0.00003	None
			Propargyl alcohol	107-19-7	5.00000	0.00003	None

Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.

- \* Total Water Volume sources may include fresh water, produced water, and/or recycled water
- \*\* Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)